

What is claimed is:

1. A photoresist composition comprising a photoactive component and a resin that comprises a hydroxyadamantyl unit.

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2. A photoresist of claim 1 wherein the hydroxyadamantyl unit is provided by polymerization of an acrylate or methacrylate.

3. A photoresist of claim 1 or 2 wherein the resin comprises photoacid-labile groups.

4. A photoresist of claim 3 wherein the resin comprises an alicyclic group in addition to the hydroxyadamantyl.

15 5. A photoresist of claim 2 or 3 wherein the resin comprises a photoacid-labile ester group.

6. A photoresist of any one of claims 1 through 5 wherein the resin comprises a polymerized cyclic olefin.

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7. A photoresist of any one of claims 1 through 6 wherein the resin comprises a polymerized monomer comprising ethylene unsaturated carbonyl or di-carbonyl.

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8. A photoresist of any one of claims 1 through 7 wherein the resin is a terpolymer.

9. A photoresist of any one of claims 1 through 8 wherein the resin is a tetrapolymer.

10. The photoresist of any one of claims 1 through 9 wherein the polymer further comprises one or more units selected from the group consisting of an acid; nitrile; an anhydride; a lactone; or a photoacid labile group that contains a leaving group that has other than an alicyclic moiety.

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11. The photoresist of any one of claims 1 through 11 wherein the polymer is substantially of aromatic groups.

10 12. A method of forming a positive photoresist relief image, comprising:
(a) applying a coating layer of a photoresist of any one of claims 1 through 11 on a substrate; and
(b) exposing and developing the photoresist layer to yield a relief image.

15 13. The method of claim 12 wherein the photoresist layer is exposed with radiation having a wavelength of less than about 200 nm.

14. The method of claim 12 wherein the photoresist layer is exposed with radiation having a wavelength of about 193 nm.

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15. An article of manufacture comprising a microelectronic wafer substrate or flat panel display substrate having coated thereon a layer of the photoresist composition of any one of claims 1 through 11.

25 16. A resin that comprises a hydroxyadamantyl unit.

17. A resin of claim 16 wherein the hydroxyadamantyl unit is provided by polymerization of an acrylate or methacrylate.

18. A resin of claim 16 or 17 wherein the resin comprises photoacid-labile groups.

19. A resin of claim 18 wherein the resin comprises an alicyclic group in addition to adamantyl.

20. A resin of claim 18 or 19 wherein the resin comprises a photoacid-labile ester group.

10 21. A resin of any one of claims 16 through 20 wherein the resin comprises a polymerized cyclic olefin.

15 22. A resin of any one of claims 16 through 21 wherein the resin is a terpolymer.

23. A resin of any one of claims 16 through 22 wherein the resin is a tetrapolymer.

20 24. A resin of any one of claims 16 through 23 wherein the polymer further comprises one or more units selected from the group consisting of an acid; nitrile; an anhydride; a lactone; or a photoacid labile group that contains a leaving group that has other than an alicyclic moiety.

25 25. A resin of any one of claims 16 through 24 wherein the polymer is substantially of aromatic groups.